NAME

ieee_functions, ilogb, isnan, copysign, fabs, fmod, nextafter, remainder, scalbn – appendix and related miscellaneous functions for IEEE arithmetic

SYNOPSIS

cc [*flag* ...] *file* ... **–lm** [*library* ...]

#include <math.h>

int ilogb(double *x***);**

int isnan(double *x***);**

double copysign(double *x***, double** *y***);**

double fabs(double *x***);**

double fmod(double *x***, double** *y***);**

double nextafter(double *x***, double** *y***);**

double remainder(double *x***, double** *y***);**

double scalbn(double *x***, int** *n***);**

MT-LEVEL

MT-Safe

DESCRIPTION

Most of these functions provide capabilities required by ANSI/IEEE Std 754-1985 or suggested in its appendix.

ilogb(*x***)** returns the unbiased exponent of *x* in integer format. **ilogb(±∞) = +MAXINT** and **ilogb(0) = –MAXINT**; **<values.h>** defines MAXINT as the largest int. **ilogb(***x***)** never generates an exception. When *x* is subnormal, **ilogb(***x***)** returns an exponent computed as if *x* were first normalized.

isnan(*x***)** returns 1 if *x* is *NaN*; otherwise it returns 0.

copysign(*x***,***y***)** returns a value with the magnitude of *x* and with the sign bit of *y*.

fabs(*x***)** returns the absolute value of *x*.

nextafter(*x***,***y***)** returns the next machine representable number from *x* in the direction *y*.

remainder(*x***,***y***)** and **fmod(***x***,***y***)** return a remainder of *x* with respect to *y*; that is, the result *r* is one of the numbers that differ from *x* by an integral multiple of *y*. Thus $(x-r)/y$ is an integral value, even though it might exceed MAXINT, the largest **int** defined in **<values.h>** if it were explicitly computed as an **int**. Both functions return one of the two such *r* smallest in magnitude. **remainder(***x***,***y***)** is the operation specified in ANSI/IEEE Std 754-1985; the result of **fmod(***x***,***y***)** may differ from **remainder**′*s* result by ±*y*. The magnitude of **remainder**′*s* result cannot exceed half that of *y*; its sign might not agree with either *x* or *y*. The magnitude of **fmod**′*s* result is less than that of *y*; its sign agrees with that of *x*. Neither function can generate an exception as long as both arguments are normal or subnormal.

remainder(*x***,***0***), fmod(***x***,***0***), remainder(∞,***y***),** and **fmod(∞,***y***)** are invalid operations; in IEEE 754 mode (i.e. the **–xlibmieee cc** compilation option), a *NaN* is returned.

scalbn(*x***,***n***)** returns $x*2**n$ computed by exponent manipulation rather than by actually performing an exponentiation or a multiplication. Thus

$$1 \leq \mathbf{scalbn(fabs(}x\mathbf{),–ilogb(}x\mathbf{))} < 2$$

for every *x* except 0, ∞, and *NaN*.

RETURN VALUES

For exceptional cases, **matherr**(3M) tabulates the values to be returned as dictated by various Standards.

SEE ALSO

matherr(3M)